The

Continental Underground Cable Company.

Principal Office, Camden, N. J.

THE

CONTINENTAL UNDERGROUND

CABLE COMPANY.

Incorporated September 9th, 1882.

Under the Laws of New Jersey.

CAPITAL STOCK, - - - - $1,000,000

500,000 SHARES, $2.00 EACH.

PRINCIPAL OFFICE, CAMDEN, N. J.

PRESIDENT,

J. S. DUBOIS, 205½ Walnut Street, Phila.

SECRETARY,

JOHN J. BURLEIGH, Camden, N. J.

TREASURER,

WILLIAM KING, 249 N. Second Street, Phila.

CONSULTING ELECTRICIAN,

RUDOLPH M. HUNTER, 901 Walnut Street, Phila.

SOLICITOR,

E. A. ARMSTRONG, 106 Market Street, Camden, N. J.

CHARTER.

The Company was incorporated under the general law of the State of New Jersey, by certificate dated September 9th, 1882, duly recorded and filed. It is empowered to purchase, and acquire, and lease, sell, or otherwise dispose of any and all patents of and concerning any and all kinds or systems of underground telegraphic and other electrical apparatus; and laying and operating the same; operating lines of pneumatic tubes underground; carrying on a general telephonic, telegraphic, and electric light business, by means of wires, cables, or conductors through subterranean channels; with full power and authority to conduct or engage in any auxiliary or contributing branches of business as may be deemed necessary or advisable.

The corporate name of the Company is "The Continental Underground Cable Company," and its period of existence is fixed at Fifty Years from the Sixteenth Day of September, A. D., 1882.

It is empowered to conduct and carry on its business throughout the territory of the United States.

The total capital stock of the Company is fixed at One Million Dollars, and is divided into Five Hundred Thousand Shares, at a par value of Two Dollars each.

The Company has acquired, and had properly assigned to it, the following letters patent of the United States, which are hereinafter more particularly described:

No. 244,752, issued to Hunter & DuBois, subject laying underground electric wires and bearing date, July 26th, 1881.

No. 260,548, issued to Josiah S. DuBois, subject underground conduit for electric wires and bearing date, July 4th, 1882.

No. 272,221, issued to Josiah S. DuBois, subject underground conduit for electric wires and bearing date, February 13th, 1883.

No. 275,387, issued to Rudolph M. Hunter, subject underground conductor and bearing date, April 10, 1883.

The principles in said Patents being set forth in the following brief pamphlet. The Company is also experimenting with other inventions, with the privilege of purchasing.

ELECTRIC

UNDERGROUND SYSTEM.

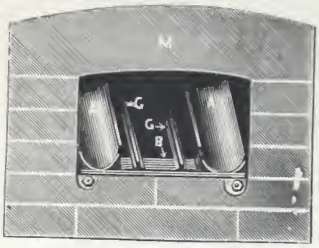
THE system for laying electric wires underground, owned by this company, is simple, cheap, compact, and substantial; as will be readily perceived by a careful examination of the following pages, which include brief data and illustrations.

The principle involved in this system accommodates itself to the requirements of one or more companies, and with the occupation of a very small space, and at a comparative small cost, while it is also possible for all telephone and telegraph companies, to occupy one conduit or plant, each of said companies having separate compartment or appartment, without interfering with each other.

Within, a sectional area of about two feet square, seven thousand (7000) wires can be laid. The process of laying the wires is extremely simple and rapid —an electric or other motor is run through on the small railway arranged in the conduit, drawing after it one or more cords or small wire ropes which are automaticly laid in one or more of the smooth circular pockets or troughs, which latter are preferably made of galvanized sheet iron. A rope thus deposited is attached at one of its ends to a cable of electric wires, the end of which is brought into the man hole, the said cable being then drawn by said rope into position in the pocket or trough and adapted for service; or the motor may be used to draw one rope through as shown in Fig. 5, and this rope may then be used to draw a carriage through upon the same railroad, the said carriage being adapted to lay wires in one or more pockets similtaneously either arranged singly or in cables. If a permanent rope be once laid the carriage alone may be used to deposit auxilliary ropes or electric conductors in the pockets, but if desired the electric motor may be used for this purpose to the exclusion of the carriage.

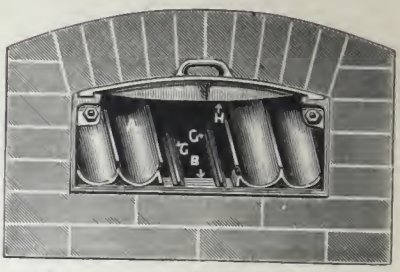
One of the simplest forms of the system is shown in Fig. 1. A conduit for one or more cables of wires is arranged on either side of the track to accommodate combined 400 wires. The small space and material required will make the cost of construction low.

Fig. 1.



Inside measurement, 4½x11 inches. Capacity, 400 wires.

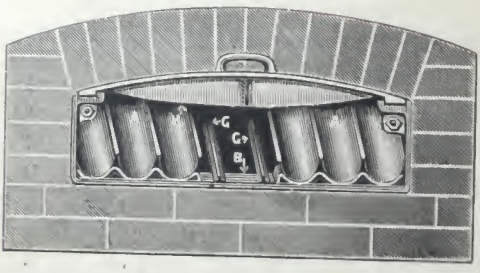
Fig. 2.



Inside measurement, 4½x17 inches. Capacity, 800 wires.

Fig. 2 is on the same general plan, with double the capacity, yet with but a small advance on the cost of construction.

Fig. 3.



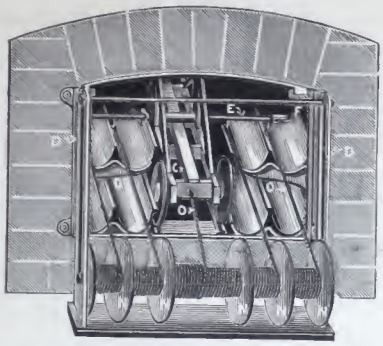
Inside measurement, 4½x23 inches. Capacity, 1200 wires.

The conduit shown in Fig. 3, will be seen to embody the same principle with capacity of 1200 wires, and this with a small advance on the cost of Fig. 2.

That shown in Fig. 1. will probably be sufficent for any one company, but where more wires are required the capacity of Fig. 2, should be had, and any single company will probably never require on any street more accommodation

for wires than can be had by the conduit shown in Fig. 3, but should a greater capacity be required the construction shown in Fig. 4, may be used, in which it

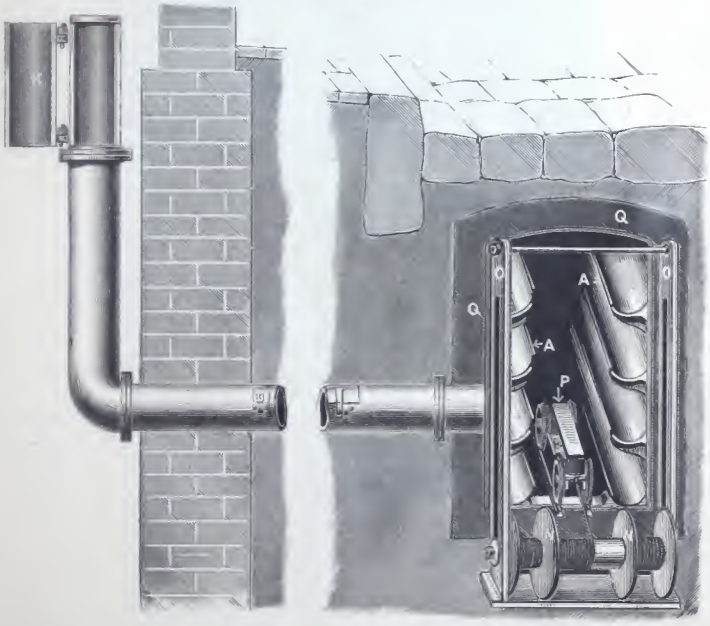
Fig. 4.



Inside measurement 9x17 inches. Capacity, 1600 wires.

is seen that the pockets are arranged similar to that shown in Fig. 2, but two deep. In place of arranging pockets as shown in Fig. 4, they may be arranged as shown in Fig. 5; in which the pockets are arranged in single rows one above the other, four deep.

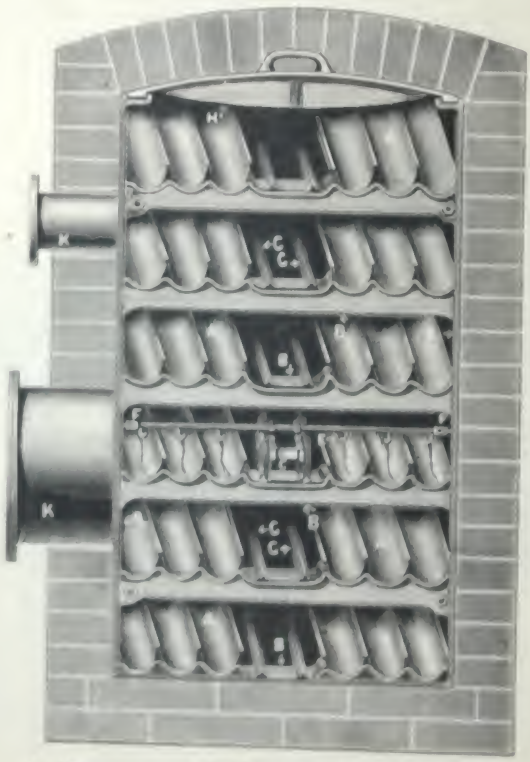
Fig. 5.



Inside measurement. 11x18 inches. Capacity, 1600 wires.

Figs. 6 and 7 show our system for laying wires on a larger scale and especially adapted to accommodate a number of separate companies, and each of said figures show the same capacity but with a slight difference in construction, the arms supporting the pockets in Fig. 6, uniting both uprights and a track is furnished to each apartment of six pockets; while in Fig. 7, the arms or brackets do not thus unite, but leave a vertical passage way from top to bottom of the conduit wherein the motor or carriage, running upon the rail of the bottom, causes its adjustable arms to travel when in the act of laying the cords, wires, or cables in the various pockets upon either side of said passage way. For an entire City only one motor and one carriage will be required, or if the process of laying the wires is to be carried on by either the carriage or motor alone, then one or the other may be dispensed with, the pockets are made semicircular; three inches wide at the top and an inch and a half deep. The space for the motor is between five and six inches wide, and as it extends from the bottom to the top of the conduit, access to the cables without removing them from their pockets can be had from the top if at any time it should be desired or become necessary, by removing one or more

Fig. 6.

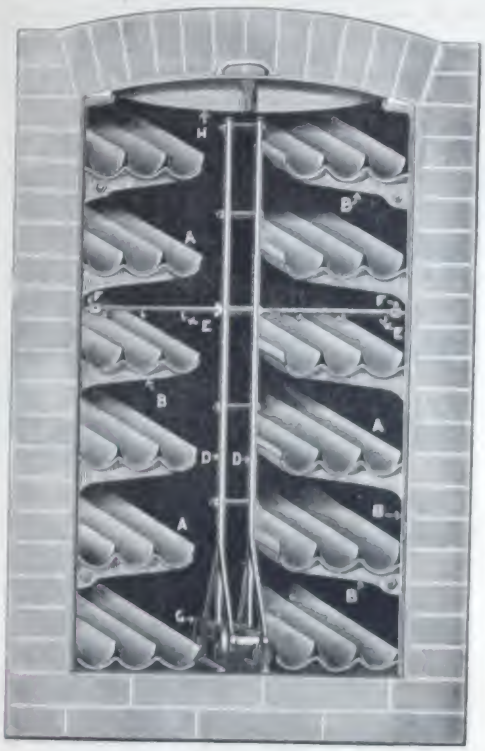


Inside measurement, 27x27 inches. Capacity, 7200 wires.

of the sealed lids. A vertical space of three inches between upper and lower pockets to enable the passage of the motor or carriage arm and also to enable the cable to be tapped and wire taken through an outlet. (See K Fig. 6.)

Where a number of companies are using the construction shown in Fig. 6, each of said companies can place a suitably arranged lock against admittance to their respective appartments.

Fig. 7.



Inside measurement, 23x27 inches. Capacity, 7200 wires.

Fig. 5 shows an electric motor in the act of drawing a cord or wire cable from a spool supported by an adjustable upright, detachably placed in a man-hole for the purpose, this cable when laid, being adapted to draw the carriage through, which in turn lays a a series of cords or cables in the various pockets, as shown in Fig. 4. If it is required that the carriage make two or more trips successively, then the carriage, in being drawn through, may also draw through an additional cable, (see Fig. 4), by which said carriage may be returned after laying the first lot of cords or electric cable, and be in readiness for a second supply.

Connections from the conduit to houses may be made by a connection run under the sidewalk and into the cellar, as shown in Fig. 5, or by simply tapping the conduit with a leaden pipe, as in making connection to gas or water main, and conveying wires through said pipe into the houses. The conduit before each house is provided with a plugged branch, which may be opened for connection as before explained.

The walls of the conduit may be built of blocks made from asphalt compound, made by an improved process, whereby it becomes impervious to moisture, and possesses great strength, and the metal uprights, brackets, and pockets, are connected with the earth to carry off induced electric currents to the earth. By this construction the conduit can be built more cheaply than if constructed entirely of iron, and in addition thereto, is not so apt to become electrically charged.

Fig. 8.

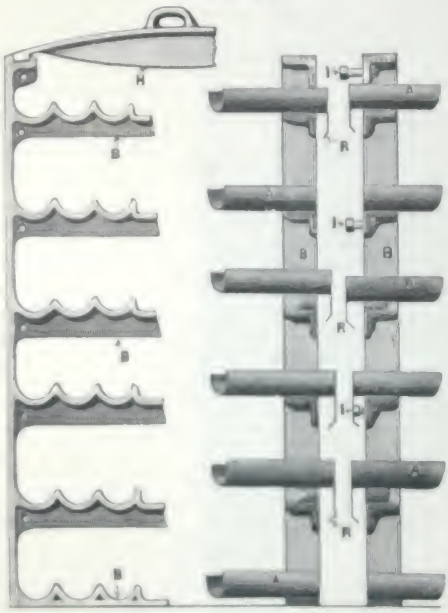


Fig. 9.

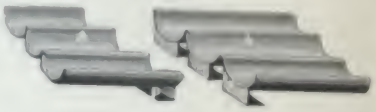


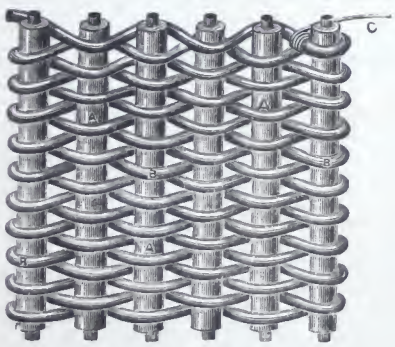
Fig. 8 shows details of construction. The circular sheet iron pockets are formed by machinery and in sections of four feet long, the ends of which are turned, as shown in Fig. 9, to receive the supporting brackets, which clamp said pockets end to end. The uprights and brackets, B, to receive the pockets A are cast in halves as in Fig. 8, and bolted together in a manner as to clamp firmly the ends of the pockets, thus uniting the adjacent sections, and thereby securing a substantially smooth pocket or trough extending from one man-hole to the next, the smooth surface overcoming any danger of injuring the cables in the act of drawing them through, and at the same time decreasing the labor. The uprights

and pockets with the railway are fitted in the machine shop, and several sections when secured together are lowered simultaneously to the foundation made for it in the street.

These are then closed in and the conduit is complete. If desired a large number of electic cables may be placed in the pockets before they are closed in and thereby lessen the subsequent work of laying said cables after the entire completion of the said conduit. The process of laying wires in the manner here in set forth, viz., where wires or cables are drawn in or out of one or more pockets without interfering with those in any other, will readily be seen to be very advantageous.

When wires are laid parallel and currents of electricity passed over them, every make, break, or change in tension of the electrical current in one or more of said wires, will produce induced currents in the other said wires being inversely proportional to the distance of the wires apart. With telegraphy these induced currents are of no great moment; but with telephony their presence is extremely objectionable, for with the small electro motive force necessary in telephonic system, their effects are felt at once and necessitate the application of means to overcome these deleterious effects, which otherwise would so injure the transmission of articulate speech as to render the telephonic system useless. The sheet iron pockets being good conductors and magnetic, tend to carry off the induced currents. The metal uprights supporting the curved pockets being grounded at proper intervals along the line to assist in conveying the induced currents to the earth.

Fig. 10.



Anti-Induction Cable.

Fig. 10, shows a general view of a portion of an anti-induction cable, adapted to underground purposes and consists of weaving together insulated telephonic wires A which form the warp, and bare enclosing wires B which form the weft, the said weft being grounded through the agency of the pockets and conduit auxiliary ground wires.

It need not be repeated that eminent electricians sustain the position that this company securely provides against the objectionable features of induction.

UNDERGROUND ELECTRIC LIGHTING SYSTEM.

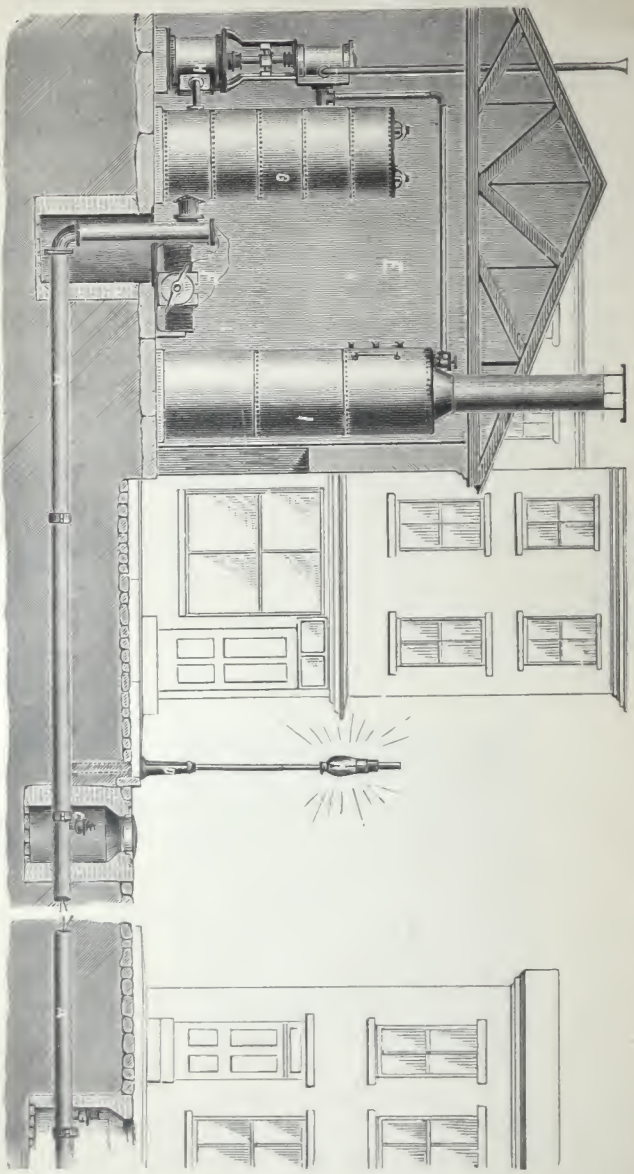


Fig. 11.

Fig. 11 represents a general view of our electric lighting system in which we have to deal with currents of electricity of high electro motive force. In such

systems in moist weather, or even the dampness of an underground conduit, allows the escape of the current and so materially reduces its tension as to render the current incapable of producing a light of but small candle power at a short distance from the generating station. Owing to this loss of electrical current it has heretofore been impracticable to place electric lighting wires under ground if the current is to be conveyed long distances.

By our system the tension of the current is retained at its maximum, and so far as dampness is concerned the tension is unaffected, thereby enabling us to convey currents underground even longer distances than it can be conveyed overground, under the ordinary variations of the hygrometric state of the atmosphere.

To attain this end we keep the air within the conduit under considerable pressure, and perfectly dry. If there is any appreciable amount of moisture in the atmosphere, the air pump H, forces the air first through a dryer G, which absorbs all the moisture, and the chemically dryed air passes into the conduit A, and when the pressure becomes over a fixed amount, the relief valves C, allows the excess of air to pass off thus keeping the pressure in the conduit uniform. Currents of high tension tend to pass off the conductors, but this tendency decreases

Fig. 12.

Fig. 13.

as the pressure of the surrounding medium (air) increases, and this effect is greatly increased by the thorough drying of the air in damp weather before passage into the conduit. The drying chemicals may be used over and over again, and the system is adapted to any substantially air tight conduit. As the pressure is constant there must be an efflux, and should there be a small leak the passage of air will be from inside outward, thus preventing ingress of moist air.

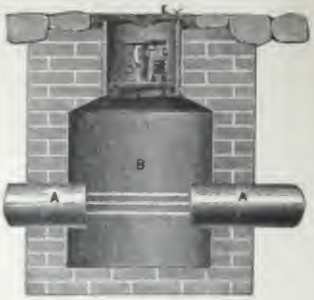
Figs. 12 and 13 represent end sections of conduits for electric lighting purposes, in which B are the conductors and A a metal pipe, the conductors B being supported by suitable insulators within said pipe. The conduit A, Fig. 11, may be continuous with testing doors in the man holes B, or if desired the conduit A, may be open on the ends when it enters the man hole as shown in Fig. 14, in which the door D is made air tight and covered by an auxiliary cover F on the road, the said door D being provided with the relief valve C. In this construction the man hole is filled with compressed air or gas.

A three inch gas pipe is considered large enough to accommodate all the electric light wires required on any street.

This principle may be applied to general conduits, which may also carry the electric light wires or instead of supplying the whole conduit with com-

pressed air the electric light wires may be enclosed in leaden tubes, and when laid in the conduit, air may be forced under pressure through said pipes. We are hampered by no limitation on this point.

Fig. 14.



Air tight manhole.

This is the only practical electric lighting underground system yet presented to the public, and companies will find that such a system would be a great saving to them, as a higher candle power of light can be obtained by its use than with the wires in the air, and this points to a reduction in work required from the Dynamo electric machines and steam engines. Besides it preserves the coating of the wires and keeps them in good condition. The pressure pumps need not run except in damp weather, or once in a while in fine weather, so as to keep a pressure in the conduit.

For detailed information relative to the working of Company, terms for territory, &c., address the

GENERAL MANAGER,

205½ Walnut Street,

PHILADELPHIA.

The Company's Improved Electric Lighting System.

The only system brought forward that proposes to convey electricity over long circuits underground, without loss of intensity of the electric current. The distant lamps burning as brilliantly as those near the generators, and all burning with a maximum brilliancy without increasing the intensity of the current over the normal, and without an extra expenditure of power and fuel used in the generation of the current.